oerlikon
metco

Material Product Data Sheet
Magnesium Zirconate – Nickel Chromium Cermet Blends

Thermal Spray Powder Products:
Metco 303NS-1

1 Introduction

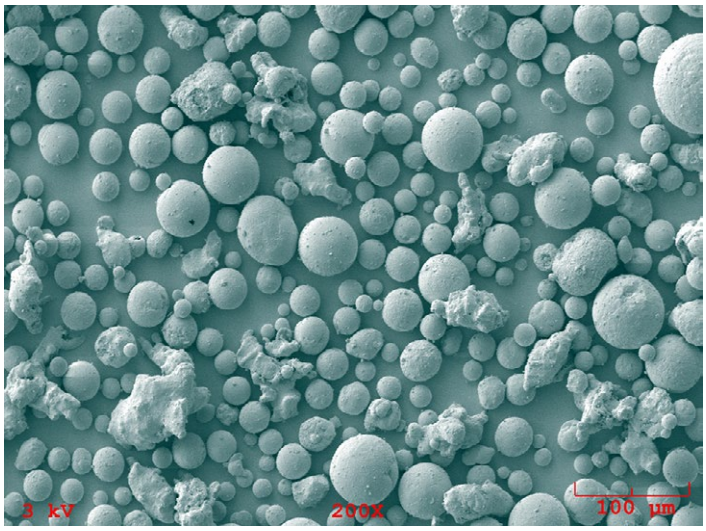
Metco™ 303NS-1 is a blend of magnesium zirconate and nickel-chromium alloy powders. It is used as thermal sprayed intermediate coatings in a three layer quasi-graded coating system that would also consists of an underlying bond coat of a nickel-chromium alloy, such as Metco 443NS, and a final top coat of a magnesium-zirconate ceramic, such as one of the Metco 210 series materials or Amdry 333.

Coatings of Metco 303NS-1 as an intermediate layer in such a coating system are characterized by a coefficient of expansion between that of the metallic bond coat and the oxide ceramic top coat. Thus, thermal stresses are well-distributed throughout the three-layer coating system. As a result, the quasi-graded coating is highly resistant to spalling and other thermal shock effects, creating an excellent thermal barrier coating.

1.1 Typical Uses and Applications

- Thermal sprayed coatings of Metco 303NS-1 are used as an intermediate layer in a three-part graded, thermal barrier coating system on jet engine combustion chambers.

Quick Facts	
Classification	Cermet
Chemistry	$MgZrO_3$ NiCr (or NiCrAl)
Manufacture	Blended
Purpose	Thermal barrier intermediate layer
Morphology	Angular and blocky / spheroidal
Service Temperature	≤ 900 °C (1650 °F)
Process	Atmospheric plasma spray



SEM photomicrograph of Metco 303NS-1 showing the morphology typical of these cermet blend materials

2 Material Information

2.1 Chemical Composition

Product	Chemical Composition (nominal weight %)						
	Oxide Ceramic (64 % – 66 % of Blend)			Metallic Constituent (34 % – 36 % of Blend)			
	ZrO_2	MgO	Other Oxides (max)	Ni	Cr	Al	Other (max)
Metco 303NS-1	Balance	15 – 30	7	72 – 85	13 – 25	–	10

2.2 Particle Size Distribution

Product	Nominal Distribution (µm)
Metco 303NS-1	–90 +11

Particle size analysis using sieve in accordance with ASTM B214 (upper range) and laser diffraction (lower range).
Other particle size distributions are available on request.

2.3 Key Selection Criteria

- Choose the product that meets the required customer material specification.
- Choose Metco 303NS-1 when the metallic bond coat product used is is a nickel-chromium powder.

2.4 Related Products

- Metco 43C-NS, Metco 43F-NS, Metco 43VF-NS, Metco 4548, Metco 5640NS, Amdry 4532 and Amdry 4535 are nickel -chromium materials that can be used as a compatible bond coat with an intermediate coat of Metco 303NS-1
- Metco 210, Metco 210NS-1, Metco 210NS-1-G, and Amdry 333 are magnesia-stabilized zirconium oxide materials that can be used as a compatible top coat with Metco 303NS-1.
- Metco 410 is an alumina-nickel-aluminum cermet material. Coatings sprayed with Metco 410 have a higher wear resistance compared to those sprayed with magnesium zirconate-nickel-chromium cermets. Metco 410 should be used with a top coat of a alumina material such as Metco 105SFP, Metco 105NS, Amdry 6060 or Amdry 6062.

2.5 Customer Specifications

Product	Customer Specification
Metco 303NS-1	Jet Avion JA 1346 Pratt & Whitney PWA 1346 Rolls-Royce plc MSRR 9507/28

3 Coating Information

3.1 Coating Parameters

Please contact your Oerlikon Metco Account Representative for parameter availability. For specific coating application requirements, the services of Oerlikon Metco's Coating Solution Centers are available.

Recommended Atmospheric Plasma Spray Guns
Metco 3MB series
Metco 9MB series
Metco F4 series
SinplexPro series

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Package Size	Availability	Distribution
Metco 303NS-1	1000583	5 lb (approx. 2.25 kg)	Special Order	Global

4.2 Handling Recommendations

- Store in the original container in a dry location.
- Open containers should be stored in a drying oven to prevent moisture pickup.
- Tumble contents prior to use to prevent segregation.

4.3 Safety Recommendations

See the SDS (Safety Data Sheet) in the version localized for the country where the material will be used. SDS are available from the Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).

Product	SDS No.
Metco 303NS-1	50-154

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